

## **Developing and Maintaining Endurance for Soccer**

Soccer is a very unique sport in that it requires a variety of physical traits such as speed, power, endurance, strength, agility and flexibility. It is by nature a mixed endurance sport: a combination of running and sprinting activities, but also involving agility, cutting, jumping, stopping/starting and change of direction movements. Since few sports mimic the physical stamina and conditioning needed in soccer, we need to focus our endurance training to account for many of these areas. This is especially important if you want to enhance your performance, particularly in the last 15-20 minutes of a game when fatigue sets in.

In this article we will discuss some training ideas, and focus on the preseason training. Here are few general concepts to consider along the way.

- Training may be different depending on the time of year. There are some differences between Early season, Pre-season and In-season training. In general, off season/early season should be low intensity - gradually advancing to higher intensity workouts and culminating with In-season training to maintain gains in speed, power, and endurance.
- Many individuals participate in multiple sports and therefore should consider training different aspects when transitioning from one sport to another. One clear example of this is skiers, who then need to transition to spring soccer. Skiing is a very quad dominant sport and does not prepare us well for the demands of running and cutting activities. It is good to start some general focus toward demands of the next sport about 6 weeks prior to transitioning from one to another.
- Many individuals play soccer year-round now, which does not provide much “off” season time. Identifying some areas of weakness and addressing these during breaks in play thru the year is important. There is some inherent value in cross-training considerations during these periods in order to train muscles differently and provide a break from soccer both mentally and physically, helping to balance the body and avoid overtraining injuries.

### **Can I increase my stamina and build endurance simply by running?**

Soccer is a sport that demands much more from us than just pure running. Let’s look at some statistics taken from FIFA about the rough stats for 90 min of playing time: Individuals cover 10-11km with 75-80% being spent at jogging/walking speeds, 10% at medium speeds, and 10%

at high speeds. During the game, they might have 35-50 “sprints” depending on the position. Most of these are relatively short duration, probably 20m or so in length.

Middle to long distance running will certainly boost our aerobic capacity and has many positive effects on cardiovascular training, conditioning, and weight control. However, this does not train our ability to sprint or make quick cutting or change of direction movements that are a significant component of our endurance needs with soccer.

Physiologically speaking, long-distance running tends to favor the development of Short Twitch (ST) muscle fibers which has a negative impact on our speed and power, and therefore limits our ability to recover quickly from short bouts of intense sprinting. There is also a greater likelihood of injury or overuse from more extensive running time and mileage.

This is not to say we that we should not do any longer distance runs, but if this is the only training you are doing then you will not achieve the explosive muscle power or endurance needed for today’s soccer stamina. The emphasis on running for conditioning is helpful in off season, but as you move in the preseason training the focus should shift to more speed/sprint/agility workouts.

### **Can I just do Speed Work and Sprints to improve my endurance?**

As we stated in the last question, relying on one specific method of training will not develop the many aspects of conditioning needed for the sport of soccer. Therefore, the obvious answer is no.

Here are the negative effects of only performing speed workouts;

- The development of Fast twitch muscle fibers (FT) which are less efficient over longer activity periods,
- Increases lactate development
- Reduces aerobic capacity
- Tends to increase risk of muscle pulls due to force production, injury.

Since the demands of soccer require the ability to perform quick bursts of speed and power movements over the course of a game, we need to train ourselves to improve this ability. This should be the emphasis of our preseason training.

What we need to remember is that training speed and power is much more demanding on our bodies and therefore should not be a year-round focus. Off season and preseason training should be focused on healing injuries, building base strength, conditioning so that as we move into the early season we will be prepared to handle the more challenging workouts involved with speed and power training.

Additionally, an important aspect of training with more high intensity workouts is that the body also needs some recovery time to avoid overuse and injury. Rest days should be incorporated to

avoid multiple back to back days of repeated speed training. This also becomes important throughout the season as we try to maintain or speed / power but allow some rest periods following intense matches or hard training days.

### **Why do I need flexibility?**

Flexibility is often a very neglected area. It is tremendously important in the health of our muscles, and is an essential component in both recovery and injury prevention.

It should be noted that improving flexibility is NOT the same as simply stretching during a warm up. There are some key differences.

### ***Stretching to improve Range of Motion***

The ability to alter muscle length requires more sustained holding and lengthening of the tissue you want to change. This may include muscle and or ligamentous/ capsular tissue around a joint. Typically, it requires stretches that are held for 30 - 60 seconds to create a lasting change in the tissue. This may be especially important or those individuals who have specific flexibility deficits, are recovering from an injury, or to improve recovery following hard workout sessions or extensive match play.

### ***Stretching for Warm- up***

Active or dynamic warm up exercises with quick stretches help to prepare muscle for more ballistic and power type movements prior to a game or practice. The goal here is to simulate many of the movements you may encounter in a game, with a reduced intensity or speed in order to provide a warm up for the muscles.

### **What role does strength training play?**

The nature of soccer requires forceful actions with multiple changes of direction, hard angle runs and cutting, and quick stops. We need to build our muscle strength to support these actions. This is not fully accomplished by running and sprint workouts alone.

Strength is one of the many factors that make up the concept of physical fitness, and most athletes can be better in their sport if they are stronger. It helps many aspects of an athlete's performance, but not all. For example, the stronger player will be able to resist physical contact and challenges better and be more resistant to injury, but strength training will not necessarily make players faster.

Off season and early preseason is good time to work on general strength conditioning such as core stability, squats, etc. As you move into later preseason workouts however, training should be turned to building a blend of explosive power and muscular endurance. From this standpoint,

we should focus our activities more on training sport specific movements than on pure static strength.

The most effective training to assist in developing these power movements is Plyometric training, also known as "jump training" or "plyos". These are exercises in which muscles exert maximum force in short intervals of time, with the goal of increasing power (strength over time).

It should be noted that this type of training is a much more challenging and demanding type of activity. You need to build up slowly with the intensity, frequency, and volume of exercise over a period of several weeks. These are not everyday movements and should have some aspect of recovery or rest versus performing multiple repeated days. In general, using body weight is recommended versus adding resistance - especially for younger age players (U16 and below). Focus should be on developing the proper mechanics and control. This includes form and alignment for running, cutting, landing and kicking.

\* It is important to remember that technique and form are essential components of building these movement patterns. If you do not have the proper control and form, then you will be more prone injury. Focus on areas of weakness and build them slowly. Training intensity can start at lower intensities (50-60%) and then build to higher levels (90% and up) building power.

### **Specific Plyometric Drills**

Here are some sample plyometrics helpful as soccer exercises. A session might contain between 10 and 15 total sets of 6-10 repetitions. For example, you could choose 4 exercises and perform 3 sets of 8 reps for each exercise.

#### **Jump Running**

This is one of the easiest plyometric exercises. Simply run in 'slow motion' jumping foot to foot landing on alternate feet. Try to achieve as much height and distance with each stride as possible. For every right and left foot strike, count one repetition.

#### **Bounding**

- Mark out a series of small cones or obstacles about 3 feet apart in a straight line. The number of obstacles depends on the number of repetitions you are performing.
- Start behind the first obstacle in a semi squat position.
- Jump as high and far as possible over each obstacle. It's a good idea to practice first to gauge how far apart you should set the markers. Try to minimize ground contact time (land and quickly explode up again).
- You can use anything to jump over, a training top or even just a line on a track.

#### **Ricochets**

- Mark out a small box shape on the floor (about 2 feet square) with paint or chalk.
- Keeping your feet together, start at one corner of the box and perform small jumps from corner to corner in a random manner.

- For this exercise, the emphasis should be on speed and rate of leg movement rather than height.
- Each ground contact is 1 repetition.

### **Lateral Jumps**

- This is an advanced plyometric exercise. Build up to it over several weeks. Keep the total number of sets for advanced exercise down to 3-6.
- Stand alongside a bench, box or cone approximately 30cm high.
- Keeping your feet hip distance apart jump sideways as high over the obstacle as possible.
- Immediately jump back to the start position minimizing ground contact time. This counts as one repetition.
- You can use anything to jump over, a training top or even just a line on a track. Just make sure you discipline yourself to jump as high as possible.

### **Depth Jumps**

- This is an advanced plyometric exercise. Build up to it over several weeks. Keep the total number of sets for advanced exercise down to 3-6.
- Stand on a box, bench or sturdy chair approximately 30-40cm high.
- Step off the bench (don't jump off) and as soon as you land explode vertically as high as you can.
- Try to minimize ground contact time i.e. don't sink down into a deep squat before jumping up.

Some Sample Plyometric Exercises for Soccer Taken from:

<http://www.sport-fitness-advisor.com/soccertraining.html>

Additional resources:

YouTube plyo videos <https://www.youtube.com/watch?v=8CmPbYj7OmA>

<https://www.youtube.com/watch?v=7mO2ybvKTzo>

Training examples

[http://images.pcmac.org/SiSFiles/Schools/GA/DouglasCounty/LithiaSpringsHigh/Uploads/Form s/Get\\_ready\\_and\\_fit\\_in\\_6wks.pdf](http://images.pcmac.org/SiSFiles/Schools/GA/DouglasCounty/LithiaSpringsHigh/Uploads/Form%20s/Get_ready_and_fit_in_6wks.pdf)

## **How can I test my Endurance?**

### **BEEP Tests**

These are 20-meter shuttle tests paced by an audiotape. There is a beep to start running, a beep when to arrive and turn at the 20-meter point, then a beep for when you are be back at the start line. The beeps continue until the athlete fails to keep the pace set by the audiotape. The score is the total distance covered (number of runs x 40 meters). Advantages: easy to do; you can test

many players at once; just need the tape and a "boom box." Disadvantage: tears the field up (at the turn-around point).

There are many types of beep tests (also called Yo-Yo tests), but they all fall into one of two categories:

- Continuous beep tests: In this method, the athlete runs continuously as there is no break. The pace gradually increases.
- Intermittent beep tests: The pace gradually increases, but in this method, after each run, there is a brief (usually 10 seconds) recovery period.

## **SPEED TESTS**

### **10-meter start**

This tests the ability to accelerate and is a good indicator of strength (or lack thereof). Begin by starting on the right foot and sprint 10 meters. Repeat this starting with the left foot forward. Perform 2 times each leg. Ideally, the score from the right leg forward and the left leg forward should be equal. If not, note discrepancies and try to correct.

### **Flying 30-meter test**

This tests your maximum velocity or speed. You are running 60 meters. You get 30 meters to accelerate and from 30 to 60 meters is the flying 30 that is tested.

### **Repeat 30 meters**

This test measures endurance of high speed running. The athlete is running 8 times 30 meters. A 30-meter sprint repeated 8 times with a short rest interval. Mark best times, average times, and level of performance drop off.

### **300 Shuttle**

The 300yd shuttle is great for large teams. It will not be accurate for testing VO<sub>2</sub> or anaerobic thresholds. Place two cones 25 yards apart. Start at one cone and on the command of the timer sprint to the far cone and touch the line, with your foot. Turn and run back moderate pace). Repeat 6 times (300 yards) without stopping.

## **12-Minute Run**

A team runs around a track as far as they can in 12 minutes. These results correlate to the athlete's VO<sub>2</sub> max. The score is how far the player ran in 12 minutes. Advantages: easy; only need a stopwatch and people to count laps. Disadvantages: pure endurance running, not soccer-specific running.

The take home message is that to maximize your performance and training you will need to focus on a variety of physical traits including speed, power, endurance, strength, agility and flexibility. The best athletes will work on determining their areas of weakness and developing them over the course of the year. Consideration should be placed on the timing of when and how you address these different needs, and incorporated into year- long training plans. Most importantly: Have fun with your training!!!

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